BST-50b OPERATOR'S MANUAL (72-76 MHz)

Synthesized Base Station Transmitter

COMTEK®

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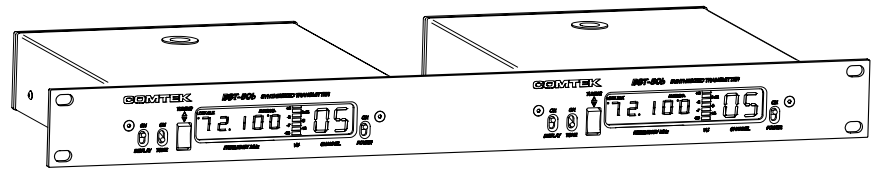
INTRODUCTION

BST-50b

Synthesized Base Station Transmitter



The **BST-50b** is a high fidelity, professional quality, base station transmitter designed for assistive listening, language translation, and remote monitoring applications. This transmitter operates under F.C.C. Part 90 in the business band which allows for higher power ideal for large area venues such as stadiums, coliseums, and auditoriums. The BST-50b transmits on a user-selectable channel in the 72-76 MHz band to a variety of COMTEK personal receivers.

OPERATING INSTRUCTIONS

Equipment Placement

The base station should be placed on top of an equipment rack, control console table, or special shelf where the pull-out whip antenna will be free of any metallic objects when fully extended.

If the base station is to be rack-mounted, it should be mounted away from equipment that uses large power transformers to reduce 60 Hz hum possibilities.

Special Note:

When using the BST-50b in close proximity to other audio equipment, ensure that the audio equipment is not susceptible to RF interference, i.e. hum, oscillations, etc. This can be accomplished by temporarily installing the BST-50b as per above and then, while the BST-50b is operating, checking all audio outputs for uncharacteristic noise. If a problem is found, move the BST-50b or the remote antenna as far as possible from the affected equipment. Should you continue to have problems, contact Comtek's application engineering department for assistance.

Remote Antenna

When the BST-50b base station is rack-mounted or when greater system range is required, a remote antenna should be used. The BST-50b base station transmitter has a 50 ohm BNC antenna port which mates with a number of standard external antennas including the Phase Right antenna (model PRA-L 72-76 MHz). The antenna should be mounted away from any metallic objects and away from the equipment rack.

Power Requirements

The base station is designed to be powered by 12 volts DC. A power adaptor is furnished for use with standard 110V AC. The on / off switch on the front panel of the base station turns on the transmitter.

Audio Input Connections

The base station transmitter has facilities for audio input from a mic, line, or speaker level source. The mic / line level audio input is a true balanced input and requires a standard XLR-3 male connector. Unbalanced input is accomplished by shorting pin-2 to pin-1 (audio ground), leaving pin-3 as the audio source. *Please note that it is recommended that all audio input cables be kept as short as possible.*

Set-up

a. Select an appropriate location for the BST-50b, i.e. a sound cabinet or closet, where there is easy access to the audio equipment and where the antenna can be extended to the correct length.

b. Set the “MIC / LINE” switch, located on the back of the BST-50b transmitter, to the appropriate position: "MIC" position for low impedance microphones or “LINE” position for line level feed from a mixer.

c. Connect the audio source or microphone to the BST-50b using the appropriate input. Be sure to set the audio input level adjust on the BST-50b to its full counter-clockwise position.

d. Plug the adaptor into a standard AC outlet, and plug the power connector into the DC input jack of the transmitter. Turn the display switch on the front of the transmitter "ON" to allow monitoring of the transmitter frequency. Turn the main power switch on the front of the BST-50b to the "ON" position. The front display should now be illuminated.

e. Mount the telescoping whip antenna in the hole on top of the BST-50b, rotating it clockwise until it is firmly seated. Extend the antenna completely. During normal operation the antenna indicator should not flash. Turn on the transmitter and verify that the antenna indicator is not flashing. If the antenna indicator is flashing, shorten the telescoping whip antenna by 2 inches and again check the indicator. Continue this procedure until the indicator remains off. If you experience trouble, please contact Comtek's application engineering department for assistance. If you are using an external type antenna, DO NOT install the telescoping antenna. Instead, connect the coaxial feed line for the external antenna to the external antenna port on the back of the BST-50b.

Note:

For optimum performance when using the telescoping whip antenna, the transmitter should be placed on a large metallic surface. Adjustment of antenna length for a “No Flash” condition on antenna indicator will insure maximum radiation.

Adjustments

In order to ensure the highest possible transmission fidelity, the transmitter must be modulating at least 50% with normal speech (-3 dB on the VU meter). This adjustment is made in the following manner:

a. Ensure that the audio source has been optimized for best signal-to-noise ratio.

b. The “MIC / LINE” switch located at the back of the transmitter should be switched to the appropriate setting: "MIC" for mic level or weak line level input; “LINE” level for line level input.

c. While normal program information is present, slowly rotate the “LEVEL” control on the back of the base station clockwise until the VU meter on the front panel begins to deflect. Only very loud speech or music should deflect the VU meter full scale.

IMPORTANT

Audio Processing and Frequency Selection

To accommodate a wide variety of receivers, the BST-50b base station transmitter has the ability to operate both companded and non-companded. (Refer to page 11 for listing of receivers to determine whether you need to operate companded or non-companded.) The display on the front panel will indicate non-companded channels (1:1 audio processing) or companded channels (2:1 audio processing). The up / down button allows you to scroll through two sets of letter channels (A-J 1:1 and A-J 2:1). All narrow-band number channels are companded (2:1 modulation).

Multiple Channel Operation

Simultaneous operation with more than two channels requires coordination of the frequencies that are used to avoid interference. This interference would result in poor or unusable performance. When multiple transmitters are broadcasting, the RF signals will "mix" together generating additional signals on other frequencies in the receiver's mixer. This condition, common to all RF receivers, is called intermodulation or intermod.

If a mixed frequency product is generated close to a frequency which you are using, the system on that frequency will experience interference. Interference produces whistle and whine type sounds and/or reductions of range. **To avoid this type of interference, you should select frequencies from one of the standard groups (see frequency group charts on page 11), or you can use COMTEK's frequency selection guide software to determine appropriate frequencies.** (Contact COMTEK to obtain a free copy of the frequency selection software.)

Test Tone

The BST-50b base station transmitter has an internal 400 Hz source which is transmitted when the "TONE" switch is enabled. This source is intended to be used to make technical adjustments and for verification of the system. When using this transmitter with "Tunable Receivers" use this tone to assist in the proper tuning of the receivers. Tune the receiver until it receives the tone and adjust the tuning until the tone is as pure and distortion free as possible. Other possible uses include; testing receivers, comparing receivers from different manufactures, range testing the system, or other tests which would require a modulated carrier. Under normal operation the "TONE" switch should be disabled.

Speech EQ

On the back of the transmitter there is a switch labeled “EQ”. With this function enabled (switch up), the audio dynamics and frequency response are processed to improve intelligibility of speech. If the primary audio source is going to be speech, you should enable this processing. If the main audio source is going to include music or other program information, you should disable it. You may want to experiment to determine which position sounds most pleasing with the program source you intend to use.

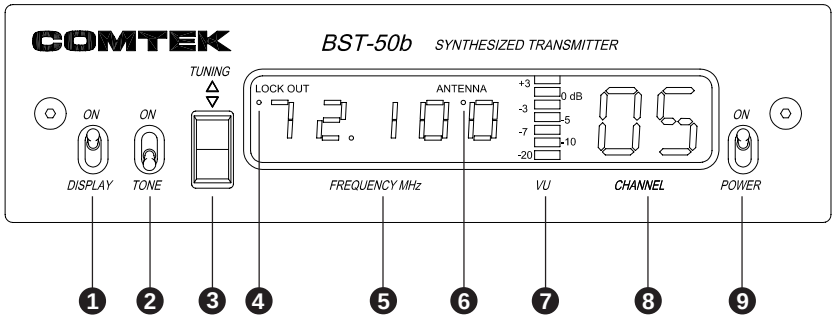
Display On / Off

The digital display can be turned on or off using the “DISPLAY” switch. Disabling the display reduces the current consumption of the transmitter for battery operation. In environments where the display could be distracting, disabling the display may also be appropriate. When the display is disabled, the tuning controls are also disabled, ensuring the transmitter frequency is not changed inadvertently. With the display disabled one segment is turned on as a power indicator. Additionally the “LOCK OUT” indicator is illuminated indicating the tuning is disabled. The VU meter and the “ANTENNA” indicator are unaffected.

Lock Out

After the transmitting frequency has been determined the transmitter tuning function can be disabled with the “LOCK OUT” switch on the back of the transmitter. This ensures that the transmitter operating frequency is not inadvertently changed. The “LOCK OUT” indicator (above the first numeric digit on the display) will illuminate indicating that the tuning has been disabled. When rack-mounting the transmitter this switch must be accessed from behind the rack, this provides added protection from intentional tampering.

BST-50b FRONT PANEL



1 DISPLAY SWITCH: This switch disables the digital display to conserve current when used with a battery.

2 TONE SWITCH: Enables / disables the internal 400 Hz test tone.

3 TUNING SWITCH: Selects the frequency on which the transmitter will operate.

4 LOCK OUT INDICATOR: Illuminates when the "TUNING" switch is disabled by setting the "LOCK OUT" switch (rear panel) to "ON".

5 DIGITAL FREQUENCY DISPLAY: Displays the frequency on which the transmitter is operating.

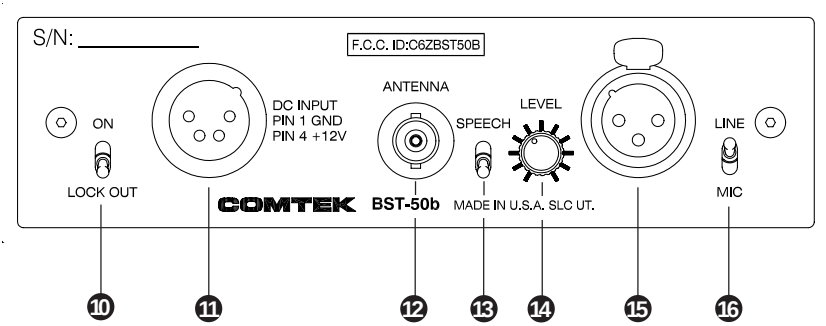
6 ANTENNA INDICATOR: Flashes when the transmitter senses a deficient antenna condition.

7 VU METER: Displays the level of audio being transmitted. Used to adjust the "LEVEL" (rear panel) control.

8 DIGITAL CHANNEL DISPLAY: Displays the channel on which the transmitter is operating.

9 POWER SWITCH: Turns the transmitter on or off.

BST-50b REAR PANEL



10 LOCK OUT SWITCH: Disables the front panel "TUNING" switch, locking the transmitter on one frequency.

11 DC INPUT JACK: Requires 12 VDC at 500 mA source (Pin-1 ground, pin-4 +12 volts).

12 EXTERNAL ANTENNA JACK: BNC connector provides a standard 50 ohm RF output for use with an external antenna.

13 SPEECH ENHANCEMENT SWITCH: Enables and disables speech enhance feature. Enable this function (switch up) for speech, and disable it (switch down) for music.

14 LEVEL CONTROL: This control should be adjusted so that normal audio deflects the VU Meter to midscale.

15 BALANCED AUDIO INPUT: Accepts audio from a PA system or dynamic microphone (Pin-1: ground).

16 MIC/LINE SWITCH: Selects the desired audio input sensitivity.

BST-50b

FREQUENCY CHART

CHAN	FREQ
01	72.020 MHz
02	72.040 MHz
03	72.060 MHz
04	72.080 MHz
05	72.100 MHz
06	72.120 MHz
07	72.140 MHz
08	72.160 MHz
09	72.180 MHz
10	72.200 MHz
11	72.220 MHz
12	72.240 MHz
13	72.260 MHz
14	72.280 MHz
15	72.300 MHz
16	72.320 MHz
17	72.340 MHz
18	72.360 MHz
19	72.380 MHz
20	72.400 MHz
21	72.420 MHz
22	72.460 MHz
23	72.500 MHz
24	72.540 MHz
25	72.580 MHz
26	72.620 MHz
27	72.640 MHz
28	72.660 MHz
29	72.680 MHz
30	72.700 MHz

CHAN	FREQ
31	72.720 MHz
32	72.740 MHz
33	72.760 MHz
34	72.780 MHz
35	72.800 MHz
36	72.820 MHz
37	72.840 MHz
38	72.860 MHz
39	72.880 MHz
40	72.900 MHz
41	72.920 MHz
42	72.940 MHz
43	72.960 MHz
44	72.980 MHz
45	74.610 MHz
46	74.630 MHz
47	74.650 MHz
48	74.670 MHz
49	74.690 MHz
50	74.710 MHz
51	74.730 MHz
52	74.750 MHz
53	74.770 MHz
54	74.790 MHz
55	75.210 MHz
56	75.230 MHz
57	75.250 MHz
58	75.270 MHz
59	75.290 MHz
60	75.310 MHz

CHAN	FREQ
61	75.330 MHz
62	75.350 MHz
63	75.370 MHz
64	75.390 MHz
65	75.420 MHz
66	75.460 MHz
67	75.500 MHz
68	75.540 MHz
69	75.580 MHz
70	75.620 MHz
71	75.640 MHz
72	75.660 MHz
73	75.680 MHz
74	75.700 MHz
75	75.720 MHz
76	75.740 MHz
77	75.760 MHz
78	75.780 MHz
79	75.800 MHz
80	75.820 MHz
81	75.840 MHz
82	75.860 MHz
83	75.880 MHz
84	75.900 MHz
85	75.920 MHz
86	75.940 MHz
87	75.960 MHz
88	75.980 MHz

BST-50b

FREQUENCY GROUPS

For Non-Companded Operation 1:1 With PR-72b and PR-75	
CHANNEL	**FREQUENCY**
A	72.100 MHz
B	72.300 MHz
C	72.500 MHz
D	72.700 MHz
E	72.900 MHz
F	75.500 MHz
G	75.700 MHz
H	75.900 MHz
I	74.700 MHz
J	75.300 MHz

For Companded Operation 2:1 With MRC-82 and MR-182	
CHANNEL	**FREQUENCY**
A	72.100 MHz
B	72.300 MHz
C	72.500 MHz
D	72.700 MHz
E	72.900 MHz
F	75.500 MHz
G	75.700 MHz
H	75.900 MHz
I	74.700 MHz
J	75.300 MHz

Companded Operation Only
2:1
With PR-25 and PR-216

GROUP ONE

CHANNEL	FREQUENCY
01	72.020 MHz
11	72.220 MHz
31	72.720 MHz
45	74.610 MHz
70	75.620 MHz
75	75.720 MHz

GROUP TWO

CHANNEL	FREQUENCY
04	72.080 MHz
09	72.180 MHz
31	72.720 MHz
53	74.770 MHz
69	75.580 MHz
85	75.920 MHz

GROUP THREE

CHANNEL	FREQUENCY
13	72.260 MHz
25	72.580 MHz
54	72.790 MHz
57	74.250 MHz
81	75.840 MHz
87	75.960 MHz

BST-50b SPECIFICATIONS

Audio Inputs:
- Mic XLR, 600 ohm Balanced -40 dBV (nominal)
- Line XLR, >10 k ohm Balanced 0 dBV (nominal)

Connectors:
- XLR-3 Female audio input connector for mic and line input
- XLR-2 Male power input 12 volts
- BNC type RF output connector

Operation Indicators:
- LED Bargraph VU Meter displays audio input (modulation)
- Two Digit Alpha Numeric Display shows operating channel
- Five Digit Numeric Display shows operating frequency
- Antenna Indicator displays deficient antenna condition
- Lock Out Indicator shows tuning has been disabled

Antenna:
- Telescopic antenna mounts directly into top of transmitter
- BNC RF output connector for optional external antenna

FCC Compliance:
Type Accepted under Part 90

Power Requirements:
12 Volts DC, 300 mA max

Frequency Response:
80 Hz to 10 kHz

Audio Distortion:
Less than 0.5% at 80% modulation

Modulation Limiter:
Soft compressor type with high (25 dB) linear overload protection, attack time less than 1 ms, recovery time 10 ms

Audio Gain Control:
Greater than 40 dB

Test Tone Generator:
400 Hz .5% distortion

Frequency Modulation:
10 kHz deviation

RF Output Power:
Set for 120 mW for FCC Part 90

Frequency Stability:
Better than 0.002%. digitally synthesized, crystal controlled

Operating Frequency:
72.020 to 75.980 MHz

Harmonic and Spurious Emissions:
Better than 55 dB below carrier

Dimensions:
6 1/2" wide x 1 3/4" high x 5 5/8" deep

Weight:
44 oz.

NOTE: Specifications subject to change without notice

WARRANTY

COMTEK warrants this product to be free from defects in workmanship and material under normal use and conditions for a period of one year from date of original purchase. Items such as batteries, neckloops and cords, are not covered by the warranty. Damage due to misuse, ill treatment and unauthorized modification and repairs are not covered by this warranty. COMTEK is not liable for consequential damages arising out of any failure of the equipment to perform as intended. COMTEK shall bear no responsibility or obligation with respect to the manner of use of any equipment sold by it. COMTEK SPECIFICALLY DISCLAIMS AND NEGATES ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF SUCH EQUIPMENT INCLUDING, WITHOUT LIMITATION, ANY WARRANTY THAT THE USE OF SUCH EQUIPMENT FOR ANY PURPOSE WILL COMPLY WITH APPLICABLE LAWS AND REGULATIONS.

Service Policies

Warranty repairs must be done by COMTEK. Only factory technicians are authorized to perform warranty service on the BST-50b transmitter. Before returning the BST-50b for service, a Return Authorization Number should be obtained from the service department by calling 1-800-496-3463 or 1-801-466-3463. Return the unit to the factory with the original or comparable packing. COMTEK will pay for insurance and ground return shipping costs in the United States for all warranty service.

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